

1. Which statement about the movement of an object with zero acceleration is true?
- (1) The object must be at rest.
  - (2) The object must be slowing down.
  - (3) The object may be speeding up.
  - (4) The object may be in motion.

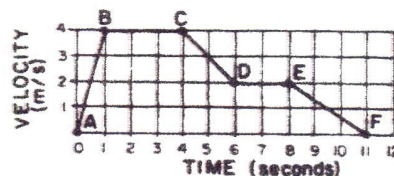
2. If the mass of a moving object could be doubled, the inertia of the object would be

- |             |                |
|-------------|----------------|
| (1) halved  | (3) unchanged  |
| (2) doubled | (4) quadrupled |

3. What is an essential characteristic of an object in equilibrium?

- (1) zero velocity
- (2) zero acceleration
- (3) zero potential energy
- (4) zero kinetic energy

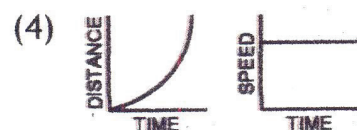
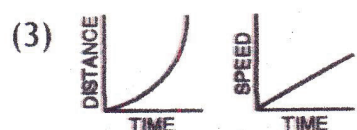
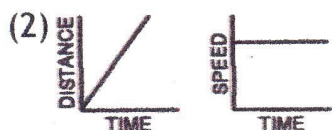
4. Base your answer on the graph below which represents the velocity-time relationship for a 2.0-kilogram mass moving along a horizontal frictionless surface.



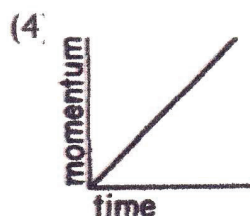
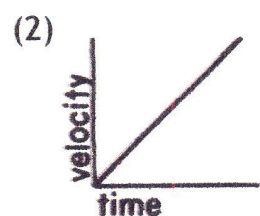
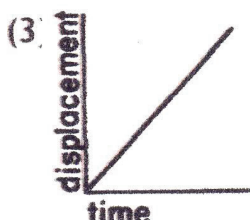
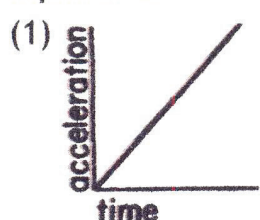
The net force on the mass during interval *DE* is

- |           |           |
|-----------|-----------|
| (1) 1.0 N | (3) 0 N   |
| (2) 2.0 N | (4) 4.0 N |

5. Which two graphs represent the motion of an object on which the net force is zero.



6. Which graph best represents an object in equilibrium?



7. An unbalanced force of 10 Newtons acts on a 20-kilogram mass for 5 seconds. the acceleration of the mass is

- (1)  $0.5 \text{ m/s}^2$  (3)  $40 \text{ m/s}^2$   
 (2)  $2 \text{ m/s}^2$  (4)  $200 \text{ m/s}^2$

8. An object accelerates at  $2.5 \text{ meters per second}^2$  when an unbalanced force of 10. Newtons acts on it. What is the mass of the object?

- (1) 1.0 kg (3) 3.0 kg  
 (2) 2.0 kg (4) 4.0 kg

9. A man weighing 800 Newtons is standing in an elevator. If the elevator rises with an acceleration of  $9.8 \text{ meters per second}^2$ , the force exerted by the elevator on the man will be

- (1) 400 N (3) 1600 N  
 (2) 800 N (4) 2000 N

10. A 50.-kilogram woman wearing a seat belt is traveling in a car that is moving with a velocity of +10. meters per second. In an emergency, the car is brought to a stop in 0.50 second. What force does the seat belt exert on the woman so that she remains in her seat?

- (1)  $-1.0 \times 10^3 \text{ N}$  (3)  $-5.0 \times 10^1 \text{ N}$   
 (2)  $-5.0 \times 10^2 \text{ N}$  (4)  $-2.5 \times 10^1 \text{ N}$

11. A student weighing 500. Newtons stands on a spring scale in an elevator. If the scale reads 520. Newtons, the elevator must be

- (1) accelerating upward
- (2) accelerating downward
- (3) moving upward at constant speed
- (4) moving downward at constant speed

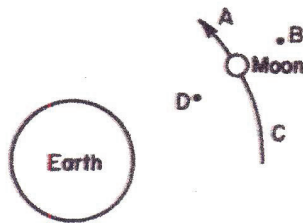
12. An unbalanced force of 10.0 Newtons causes an object to accelerate at  $2.0 \text{ m/s}^2$ . What is the mass of the object?

- (1) 0.2 kg
- (2) 5.0 kg
- (3) 8.0 kg
- (4) 20 kg

13. Base your answer on the diagram below which represents the moon in a circular orbit around the earth.

Mass of the earth =  $6.0 \times 10^{24} \text{ kg}$ .

Mass of the moon =  $7.3 \times 10^{23} \text{ kg}$ .



Compared to the force of the earth on the moon, the magnitude of the force of the moon on the earth is

- (1)  $10^{-2}$  as great
- (2) the same
- (3)  $10^1$  as great
- (4)  $10^2$  as great

14. An object weighing 4 Newtons rests on a horizontal tabletop. The force of the tabletop on the object is

- (1) 0 N
- (2) 4 N horizontally
- (3) 4 N downward
- (4) 4 N upward

15. A table exerts a 2.0-newton force on a book lying on the table. The force exerted by the book on the table is

- (1) 20. N
- (2) 2.0 N
- (3) 0.20 N
- (4) 0 N

16. The magnitude of the force that a baseball bat exerts on a ball is 50. Newtons. The magnitude of the force that the ball exerts on the bat is

- (1) 5.0 N
- (2) 10. N
- (3) 50. N
- (4) 250 N

17. A 1-kilogram object rests on a horizontal table top. The force that the table top exerts on the object is

- (1) 1 N
- (2) 2 N
- (3) 0 N
- (4) 9.3 N

18. A test booklet is sitting at rest on a desk. Compared to the magnitude of the force of the booklet on the desk, the magnitude of the force of the desk on the booklet is

- (1) less
- (2) greater
- (3) the same